

1 **In the Claims**

2 Claims 1, 19, 37 and 55 have been amended.

3 Claim 43 has been cancelled.

4
5 1. (Currently Amended) In a distributed computing environment, a
6 computer-implemented method for implementing workflow responsive to a
7 directory object state change, the method comprising:

8 automatically detecting a state change to an object in a directory, the
9 directory corresponding to a directory schema, the directory schema defining a
10 hierarchy of content classes, wherein at least one content class of the hierarchy
11 includes a flexible attribute; and

12 responsive to detecting the state change, automatically:

13 mapping the state change to the object to a workflow comprising a
14 set of tasks; and

15 executing the tasks to achieve a desired state in the directory.

16
17 2. (Previously Presented) The method of claim 1, wherein executing
18 the tasks further comprises storing the desired state.

19
20 3. (Previously Presented) The method of claim 1, wherein executing
21 the tasks further comprises continuously executing an operation of a task of the
22 tasks until convergence of the desired state is identified.

23
24 4. (Previously Presented) The method of claim 1, wherein executing
25 the tasks further comprises storing a sequence of operations based on the tasks.

1 5. (Previously Presented) The method of claim 1, wherein executing
2 the tasks further comprises storing information corresponding to one or more
3 directory objects to which the workflow applies.

4
5 6. (Previously Presented) The method of claim 1, wherein executing
6 the tasks further comprises storing status information based on respective status of
7 at least one subset of the tasks.

8
9 7. (Previously Presented) The method of claim 1, wherein mapping
10 the state change to the object further comprises evaluating the state change to the
11 object based on a declarative condition stored as a text string on an object instance
12 of a content class defined by the directory schema.

13
14 8. (Previously Presented) The method of claim 1, wherein a task of
15 the tasks comprises any combination of a declarative condition or an operation that
16 is stored as a text string on an object instance of a content class defined by the
17 directory schema.

18
19 9. (Previously Presented) The method of claim 1, wherein semantics of
20 the workflow are based on a workflow schema.

21
22 10. (Previously Presented) The method of claim 1, wherein mapping the
23 state change to the object, semantics of the mapping are based on an event
24 association object schema.

1 11. (Previously Presented) The method of claim 1, wherein executing
2 the tasks at least one subset of the tasks are executed with respect to one another
3 based on an order of execution relationship comprising a finish-start relationship, a
4 parallel execution relationship, a precedence constraint relationship, or a task
5 priority relationship.

6
7 12. (Previously Presented) The method of claim 1, wherein executing
8 the tasks at least one subset of the tasks is executed with respect to one another
9 based on a precedence constraint relationship or a task priority relationship.

10
11 13. (Previously Presented) The method of claim 1, wherein the method
12 further comprises:

13 monitoring a status corresponding to a task of the tasks;

14 storing the status on a status monitoring object; and

15 wherein a content class in the directory schema defines the status-
16 monitoring object.

17
18 14. (Previously Presented) The method of claim 1, wherein the method
19 further comprises:

20 monitoring a set of directory resources affected by the workflow;

21 storing the directory resources on a status monitoring object; and

22 wherein a content class in the directory schema defines the status-
23 monitoring object.

1 15. (Previously Presented) The method of claim 1, wherein the method
2 further comprises:

3 monitoring a status corresponding to an operation of the workflow;

4 determining that the status comprises a failure status;

5 responsive to the determining, taking a corrective action to advance the
6 workflow in view of the failure status; and

7 wherein a content class in the directory schema defines the status-
8 monitoring object.

9
10 16. (Previously Presented) The method of claim 1, wherein executing
11 the tasks further comprises:

12 updating a status corresponding to a task in the workflow; and

13 responsive to the updating, evaluating the workflow to determine that a
14 next task of the tasks to be implemented.

15
16 17. (Previously Presented) The method of claim 1, wherein the tasks
17 represent an inverse set of tasks that were previously performed as part of a
18 different workflow.

19
20 18. (Previously Presented) The method of claim 1, wherein the tasks
21 implement a policy with respect to one or more directory resources, and wherein
22 mapping the state change to the object further comprises automatically
23 determining the workflow based on the policy.

1 19. (Currently Amended) A computer-readable medium comprising
2 computer-executable instructions to implement workflow responsive to a directory
3 object state change, the computer-executable instructions comprising instructions
4 for:

5 detecting a state change to an object in a directory, wherein at least one
6 object of the directory is defined by a flexible attribute configured to store a
7 plurality of different data types, the functionality of the at least one object varying
8 in accordance with the data type stored on the at least one object; and

9 responsive to detecting the state change:

10 mapping the state change to the object to a workflow comprising a
11 set of tasks; and

12 executing the tasks to achieve a desired state in the directory.

13
14 20. (Previously Presented) The computer-readable medium of claim
15 19, wherein the instructions for executing the tasks further comprise instructions
16 for storing the desired state.

17
18 21. (Previously Presented) The computer-readable medium of claim
19 19, wherein the instructions for executing the tasks further comprise instructions
20 for continuously executing an operation of a task of the tasks until convergence of
21 the desired state is identified.

22
23 22. (Previously Presented) The computer-readable medium of claim
24 19, wherein the instructions for executing the tasks further comprise instructions
25 for storing a sequence of operations based on the tasks.

1 23. (Previously Presented) The computer-readable medium of claim
2 19, wherein instructions for executing the tasks further comprise instructions for
3 storing information corresponding to one or more directory objects to which the
4 workflow applies.

5
6 24. (Previously Presented) The computer-readable medium of claim
7 19, wherein the instructions for executing the tasks further comprise instructions
8 for storing status information based on respective status of at least one subset of
9 the tasks.

10
11 25. (Previously Presented) The computer-readable medium of claim
12 19, wherein the instructions for mapping the state change to the object further
13 comprise instructions for evaluating the state change to the object based on a
14 declarative condition stored as a text string on an object instance of a content class
15 defined by a directory schema.

16
17 26. (Previously Presented) The computer-readable medium of claim
18 19, wherein a task of the tasks comprises any combination of declarative
19 conditions and operations that are stored as a text string on an object instance of a
20 content class defined by a directory schema.

21
22 27. (Previously Presented) The computer-readable medium of claim
23 19, wherein semantics of the workflow are based on a workflow schema.

1 28. (Previously Presented) The computer-readable medium of claim
2 19, wherein the instructions for mapping the state change to the object, semantics
3 of the mapping are based on an event association object schema.

4
5 29. (Previously Presented) The computer-readable medium of claim
6 19, wherein the instructions for executing the tasks, at least one subset of the tasks
7 are executed with respect to one another based on an order of execution
8 relationship comprising a finish-start relationship, a parallel execution
9 relationship, a precedence constraint relationship, or a task priority relationship.

10
11 30. (Previously Presented) The computer-readable medium of claim
12 19, wherein the instructions for executing the tasks, at least one subset of the tasks
13 are executed with respect to one another based on a precedence constraint
14 relationship or a task priority relationship.

15
16 31. (Previously Presented) The computer-readable medium of claim
17 19, wherein the computer-executable instructions further comprise instructions
18 for:

19 automatically:

20 monitoring a status corresponding to a task of the tasks; and

21 storing the status on a status monitoring object; and

22 wherein a content class in the directory schema defines the status-
23 monitoring object.

1 32. (Previously Presented) The computer-readable medium of claim 19,
2 wherein the computer-executable instructions further comprise instructions for:
3 automatically:
4 monitoring a set of directory resources affected by the workflow;
5 and
6 storing the directory resources on a status monitoring object; and
7 wherein a content class in the directory schema defines the status-
8 monitoring object.

9
10 33. (Previously Presented) The computer-readable medium of claim
11 19, wherein the computer-executable instructions further comprises instructions
12 for automated operations for:

13 monitoring, by a status-monitoring object defined by a content class in the
14 directory schema, a status corresponding to an operation of the workflow;
15 determining that the status comprises a failure status;
16 responsive to the determining, taking a corrective action to advance the
17 workflow in view of the failure status

18
19 34. (Previously Presented) The computer-readable medium of claim
20 19, wherein the instructions for executing the tasks further comprise instructions
21 for:

22 updating a status corresponding to a task in the workflow; and
23 responsive to the updating, evaluating the workflow to determine that a
24 next task of the tasks to be implemented.

1 35. (Previously Presented) The computer-readable medium of claim
2 19, wherein the tasks represent an inverse set of tasks that were previously
3 performed as part of a different workflow.

4
5 36. (Previously Presented) The computer-readable medium of claim
6 19, wherein the tasks implement a policy with respect to one or more directory
7 resources, and wherein the instructions for mapping the state change to the object
8 further comprises instructions for automatically determining the workflow based
9 on the policy.

10
11 37. (Currently Amended) A computing device comprising:
12 a memory comprising computer-executable instructions for automatically
13 implementing workflow responsive to a directory object state change; and
14 a processor coupled to the memory for executing the computer-executable
15 instructions, the computer-executable instructions comprising instructions for:
16 detecting a state change to an object in a directory, the directory
17 corresponding to a directory schema; and
18 responsive to detecting the state change:
19 mapping the state change to the object to a workflow comprising a
20 set of tasks, the mapping including evaluating the state change to the object
21 based on a declarative condition stored as a text string on an object instance
22 of a content class defined by the directory schema; and
23 executing the tasks to achieve a desired state in the directory.
24
25

1 38. (Previously Presented) The computing device of claim 37, wherein
2 the instructions for executing the tasks further comprise instructions for storing the
3 desired state.

4
5 39. (Previously Presented) The computing device of claim 37, wherein
6 the instructions for executing the tasks further comprise instructions for
7 continuously executing an operation of a task of the tasks until convergence of the
8 desired state is identified.

9
10 40. (Previously Presented) The computing device of claim 37, wherein
11 the instructions for executing the tasks further comprise instructions for storing a
12 sequence of operations based on the tasks.

13
14 41. (Previously Presented) The computing device of claim 37, wherein
15 instructions for executing the tasks further comprise instructions for storing
16 information corresponding to one or more directory objects to which the workflow
17 applies.

18
19 42. (Previously Presented) The computing device of claim 37, wherein
20 the instructions for executing the tasks further comprise instructions for storing
21 status information based on respective status of at least one subset of the tasks.

22
23 43. (Cancelled)
24
25

1 44. (Previously Presented) The computing device of claim 37, wherein
2 a task of the tasks comprises any combination of one or more declarative
3 conditions and one or more operations represented by a text string stored on an
4 object instance of a content class defined by the directory schema.

5
6 45. (Previously Presented) The computing device of claim 37, wherein
7 semantics of the workflow are based on a workflow schema.

8
9 46. (Previously Presented) The computing device of claim 37, wherein
10 the instructions for mapping the state change to the object, semantics of the
11 mapping are based on an event association object schema.

12
13 47. (Previously Presented) The computing device of claim 37, wherein
14 the instructions for executing the tasks, at least one subset of the tasks are
15 executed with respect to one another based on an order of execution relationship
16 comprising a finish-start relationship, a parallel execution relationship, a
17 precedence constraint relationship, or a task priority relationship.

18
19 48. (Previously Presented) The computing device of claim 37, wherein
20 the instructions for executing the tasks, at least one subset of the tasks are
21 executed with respect to one another based on a precedence constraint relationship
22 or a task priority relationship.

1 49. (Previously Presented) The computing device of claim 37, wherein
2 the computer-executable instructions further comprise instructions for:
3 monitoring a status corresponding to a task of the tasks;
4 storing the status on a status monitoring object; and
5 wherein a content class in the directory schema defines the status-
6 monitoring object.

7
8 50. (Previously Presented) The computing device of claim 37, wherein
9 the computer-executable instructions further comprise instructions for:
10 monitoring a set of directory resources affected by the workflow;
11 storing the directory resources on a status monitoring object; and
12 wherein a content class in the directory schema defines the status-
13 monitoring object.

14
15 51. (Previously Presented) The computing device of claim 37, wherein
16 the computer-executable instructions further comprises instructions for:
17 monitoring a status corresponding to an operation of the workflow;
18 determining that the status comprises a failure status;
19 responsive to the determining, taking a corrective action to advance the
20 workflow in view of the failure status; and
21 wherein a content class in the directory schema defines the status-
22 monitoring object.

1 52. (Previously Presented) The computing device of claim 37, wherein
2 the instructions for executing the tasks further comprise instructions for:
3 updating a status corresponding to a task in the workflow; and
4 responsive to the updating, evaluating the workflow to determine that a
5 next task of the tasks to be implemented.

6
7 53. (Previously Presented) The computing device of claim 37, wherein
8 the tasks represent an inverse set of tasks that were previously performed as part of
9 a different workflow.

10
11 54. (Previously Presented) The computing device of 37, wherein the
12 tasks implement a policy with respect to one or more directory resources, and
13 wherein the instructions for mapping the state change to the object further
14 comprises instructions for automatically determining the workflow based on the
15 policy.

1 55. (Currently Amended) A computing device comprising automated
2 processing means for:

3 detecting a state change to an object in a directory, the directory
4 corresponding to at least one content class, wherein at least one object of the at
5 least one content class is defined by a flexible attribute, and wherein the
6 functionality of the at least one object varies in accordance with the data type
7 stored thereon; and

8 responsive to detecting the state change:

9 mapping the state change to the object to a workflow comprising a
10 set of tasks; and

11 executing the tasks to achieve a desired state in the directory.

12
13 56. (Previously Presented) A computing device of claim 55, wherein
14 the means for executing the tasks further comprise means for storing the desired
15 state.

16
17 57. (Previously Presented) A computing device of claim 55, wherein
18 the means for executing the tasks further comprise means for continuously
19 executing an operation of a task of the tasks until convergence of the desired state
20 is identified.

21
22 58. (Previously Presented) A computing device of claim 55, wherein
23 the means for executing the tasks further comprise means for storing a sequence of
24 operations based on the tasks.

1 59. (Previously Presented) A computing device of claim 55, wherein
2 means for executing the tasks further comprise means for storing information
3 corresponding to one or more directory objects to which the workflow applies.
4

5 60. (Previously Presented) A computing device of claim 55, wherein
6 the means for executing the tasks further comprise means for storing status
7 information based on respective status of at least one subset of the tasks.
8

9 61. (Previously Presented) A computing device of claim 55, wherein
10 the means for mapping the state change to the object further comprise means for
11 evaluating the state change to the object based on a declarative condition stored as
12 a text string on an object instance of a content class defined by the directory
13 schema.
14

15 62. (Previously Presented) A computing device of claim 55, wherein a
16 task of the tasks comprises any combination of one or more declarative conditions
17 and one or more operations represented by a text string stored on an object
18 instance of a content class defined by the directory schema.
19

20 63. (Previously Presented) A computing device of claim 55, wherein
21 semantics of the workflow are based on a workflow schema.
22

23 64. (Previously Presented) A computing device of claim 55, wherein
24 the means for mapping the state change to the object, semantics of the mapping
25 are based on an event association object schema.

1 65. (Previously Presented) A computing device of claim 55, wherein
2 the means for executing the tasks, at least one subset of the tasks are executed with
3 respect to one another based on an order of execution relationship comprising a
4 finish-start relationship, a parallel execution relationship, a precedence constraint
5 relationship, or a task priority relationship.
6

7 66. (Previously Presented) A computing device of claim 55, wherein
8 the means for executing the tasks, at least one subset of the tasks are executed with
9 respect to one another based on a precedence constraint relationship or a task
10 priority relationship.
11

12 67. (Previously Presented) A computing device of claim 55, further
13 comprising processing means for:

14 monitoring a status corresponding to a task of the tasks;

15 storing the status on a status monitoring object; and

16 wherein a content class in the directory schema defines the status-
17 monitoring object.
18

19 68. (Previously Presented) A computing device of claim 55, further
20 comprising automated processing means for:

21 monitoring a set of directory resources affected by the workflow;

22 storing the directory resources on a status monitoring object; and

23 wherein a content class in the directory schema defines the status-
24 monitoring object.
25

1 69. (Previously Presented) A computing device of claim 55, further
2 comprising automated processing means for:

3 monitoring a status corresponding to an operation of the workflow;
4 determining that the status comprises a failure status;
5 responsive to the determining, taking a corrective action to advance the
6 workflow in view of the failure status.

7
8 70. (Previously Presented) A computing device of claim 55, wherein
9 the automated processing means for executing the tasks further comprise means
10 for:

11 updating a status corresponding to a task in the workflow; and
12 responsive to the updating, evaluating the workflow to determine that a
13 next task of the tasks to be implemented.

14
15 71. (Previously Presented) A computing device of claim 55, wherein
16 the tasks represent an inverse set of tasks that were previously performed as part of
17 a different workflow.

18
19 72. (Previously Presented) A computing device of claim 55, wherein
20 the tasks implement a policy with respect to one or more directory resources, and
21 wherein the means for mapping the state change to the object further comprise
22 means for automatically determining the workflow based on the policy.

1 73. (Previously Presented) A computer-readable medium comprising
2 workflow enabled directory schema for automated workflow implementation by a
3 set of computer-program instructions executable by a processor, the workflow
4 enable directory schema comprising a plurality of base object content classes
5 comprising:

6 a provisioning service content class to detect an event corresponding to a
7 state change in a directory object;

8 a workflow content class for storing a sequence of tasks;

9 an event association content class for storing declarative conditions to map
10 the state change to the directory object to an object instance of the workflow
11 content class; and

12 wherein the provisioning service content class is further configured to
13 execute the sequence of tasks corresponding to the object instance.

14
15 74. (Previously Presented) The computer-readable medium of claim 73,
16 wherein at least a subset of the base object content classes comprise a respective
17 flexible attribute data field that indicates a data type, the data type being used to
18 express various operational or data providing properties of the flexible attribute,
19 the various operational or data providing properties being independent of the data
20 type and independent of any modification to the workflow enabled directory
21 schema.

22
23 75. (Previously Presented) The computer-readable medium of claim 73,
24 wherein the sequence of tasks comprises any combination of a declarative
25 conditions and operations corresponding to directory-based objects.

1 76. (Previously Presented) The computer-readable medium of claim 73,
2 further comprising a status monitoring content class for storing a status of an
3 object instance of the workflow content class.

4
5 77. (Canceled)

6
7 78. (Previously Presented) A computer comprising the processor
8 coupled to a memory comprising the computer-readable medium of claim 73.